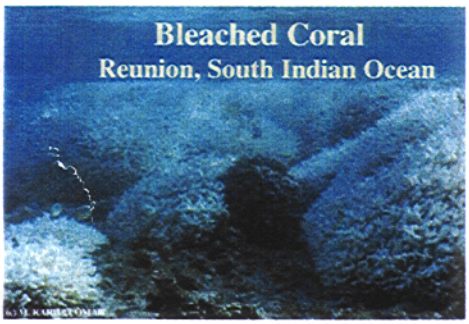
CORAL REEF WATCH 2002

National Environmental Satellite, Data, and Information Service (NESDIS) - Office of Research and Applications (ORA), National Oceanographic Data Center (NODC), National Geophysical Data Center (NGDC), Office of Satellite Data Processing and Distribution (OSDPD) - **Oceanic and Atmospheric Research (OAR)** - Atlantic Oceanographic and Meteorological Laboratory (AOML)

The NESDIS and OAR Coral Reef Watch program will strive to fully utilize NOAA coral resources to monitor and predict changes in coral reef ecosystems worldwide. A major objective is to discern the relationship between the magnitude and persistence of higher than normal sea surface temperatures in coral reef areas and coral reef bleaching and mortality. This program supports coral reef managers and researchers through Web-access to coral reef environmental data and coral bleaching alerts.

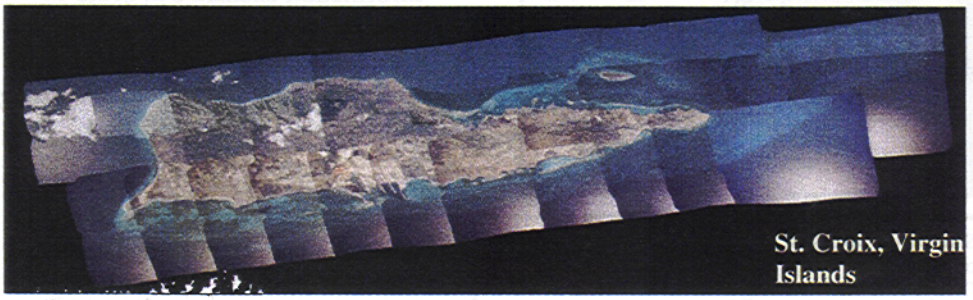
BACKGROUND: Coral reefs are one of the most diverse ecosystems in the World, supporting essential coastal fisheries, offering potential medicines, protecting coasts from erosion, and supporting coastal tourism industries.

Over the past few years, anomalously warm sea surface temperatures have led to increased incidence of coral reef bleaching around the globe. This stress compounds those already incurred via natural factors such as hurricanes and factors associated with detrimental human activities, such as overfishing, anchor damage, sediment and nutrient run-off, and unregulated tourism. Increased deterioration of coral ecosystems is of major concern.



Recognizing the need to protect these fragile ecosystems, the federal government called for increased research and monitoring of Coral Reefs for improved management.

Since 1995, NESDIS has been producing Web-accessible, satellite-derived, sea surface temperature products to monitor for potential coral reef bleaching. Additionally, NESDIS has been providing technical support for coral reef mapping efforts, developing a robust and comprehensive international coral reef data management system, using paleo-climate records to describe the coral reef environment in the past (>100 yrs), and building interagency and international collaborations in coral monitoring and research. Simultaneously, OAR/AOML has been developing the Coral Reef Early Warning System (CREWS), an international network of coral reef environmental monitoring stations placed at reef locations that monitor for conditions conducive to coral reef bleaching as well as provide data for coral reef ecosystem modeling and research efforts.

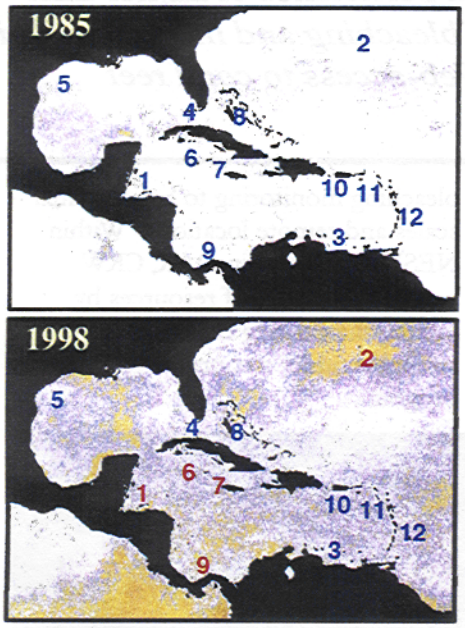


CORAL REEF WATCH (CRW): In an effort to expand NOAA's coral reef monitoring and bleaching alert capabilities NESDIS and OAR joined their complimentary coral activities under the Coral Reef Watch initiative (2000). CREWS data serve to validate NESDIS satellite derived monitoring products, while NESDIS satellite products extend coral reef bleaching monitoring to larger spatial scales and remote locations. Within NESDIS and within OAR, CRW maximizes coral reef resources by joining the existing coral reef strengths under a coordinated program.

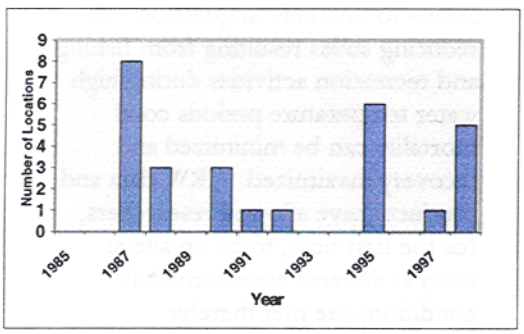
BENEFITS: For Coral Reef managers CRW near real time monitoring products permit immediacy in response to changing ecosystem character, which has allowed for improved regulation of access to the reefs in question. By reducing stress resulting from fishing and recreation activities during high water temperature periods coral mortality can be minimized and recovery maximized. CRW data and products have allowed researchers, for the first time, to be on site as soon as adverse environmental conditions are met thereby improving our understanding of coral bleaching phenomena. Moreover, the accumulation of CRW long-term data sets will aid in our understanding of coral reef's response to climate change as well as coral reef ecosystem function.

Representative Reef Locations

Belize (1)	Jamaica (7)
Bermuda (2)	Lee Stocking, Bahamas (8)
Bonaire (3)	Panama - Atlantic (9)
Dry Tortugas, Fl (4)	Puerto Rico (10)
Flower Garden, TX (5)	St. Croix, US VI (11)
Grand Cayman (6)	St. Lucia (12)



Satellite-derived **HotSpot Charts** highlighting regions of potential thermally- induced coral reef bleaching. Orange indicates bleaching potential and white indicates no bleaching potential. Numbers correspond to representative reef locations in the table above. A red number indicates a site that experienced temperatures conducive to coral reef bleaching during the specified year. Over the years 1985-1998, 1985 was a relatively cool year, while 1998 was relatively warm.



Bar graph highlighting the variability in the number of the 12 representative reef locations in the table above that experienced sea surface temperatures conducive to coral reef bleaching during each year from 1985-1998. (Based on HotSpot charts)

PLANS: In 2002, NESDIS and OAR seek to improve spatial coverage, reliability, quality, and accessibility of CRW data and products by:

~ Expanding the network of coral reef environmental monitoring stations to the U.S. Virgin Islands and American Samoa.

~ Adding pollutant indicator sensors to existing environmental monitoring stations to provide a more complete set of environmental parameters for monitoring and modeling coral reef ecosystems.

~ Improving national and international collaboration and information exchange in order to validate monitoring data and bleaching alert products as well as better understand the coral bleaching phenomena.

~ Securing technical support for near real time coral reef satellite bleaching and monitoring products to ensure their availability during critical seasons.

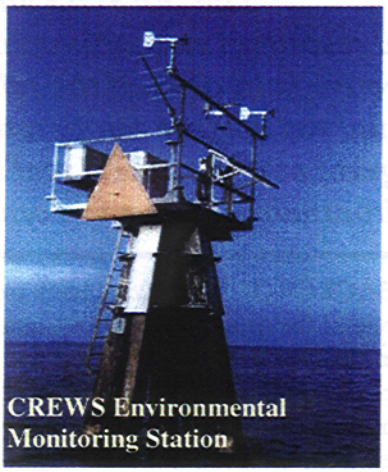
~ Increasing the spatial resolution of satellite monitoring and bleaching alert products, thus improving applicability and relevance to smaller scale ecosystems.

~ Performing temporal assessments of coral reef bleaching using high-resolution satellite data.

~ Providing automated bleaching event maps in user friendly formats (e.g. Geographic Information System formats).

~ Extending the sea surface temperature records using the coral paleo-climate proxy record, thereby promoting an understanding of corals response to environmental conditions in the past.

~ Continuing development of the NOAA international Coral Reef Information System that enhances access to NOAA, national, and international coral reef data and information World-wide.


CREWS Environmental Monitoring Station

SUMMARY: The Coral Reef Watch 2002 initiative embodies a coordinated NESDIS and OAR coral monitoring and bleaching research program that responds to a need for improved understanding of coral reef ecosystems and fulfills NOAA's mission to Sustain Healthy Coasts. The planned 2002 activities fully exploit NESDIS' and OAR's expertise in data management, satellite mapping, and monitoring to support coral reef research and management.

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RELATED WEB-SITES:

http://www.coral.noaa.gov/crw/

http://coral.aoml.noaa.gov/corvil/coral_refs/index.html

http://www.coral.noaa.gov/crw/

http://www.ngdc.noaa.gov/paleo/paleo.html

http://www.nodc.noaa.gov/col/projects/coral/Coralhome.html

http://orbit-net.nesdis.noaa.gov/orad/coral_bleaching_index.html

http://orbit-net.nesdis.noaa.gov/orad/sub/dhw_dhww_2m.html